

Notice of Allowability

Application No.

09/585,472

Examiner

Timothy L. Rude

Applicant(s)

SAKAMOTO, MICHIAKI

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 03 May 2007.
2. ☒ The allowed claim(s) is/are 1, 2, 4-12, 15-18, 21-26, and 28-32.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 20070815.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

tlr

DETAILED ACTION

Claims

Claims 1, 2, 6, 7, 11, 17, 28, and 31 are amended. Claim 27 is canceled.

Election/Restrictions

All claims are directed to an allowable product or process. Pursuant to the procedures set forth in MPEP § 821.04(B), claims 2, 6, 7-12, 15-18, 21-23, and 26, directed to the process of making or product, previously withdrawn from consideration as a result of a restriction requirement, are hereby rejoined and fully examined for patentability under 37 CFR 1.104.

Because all claims previously withdrawn from consideration under 37 CFR 1.142 have been rejoined, **the restriction requirements as set forth in the Office action mailed on 21 October 2003 and 18 October 2004 are hereby withdrawn.** In view of the withdrawal of the restriction requirement as to the rejoined inventions, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Allowable Subject Matter

Claims 1, 2, 4-12, 15-18, 21-26, and 28-32 are allowed.

The following is an examiner's statement of reasons for allowance:

As to independent claims 1, 2, and 11, relevant prior art of record did not disclose, alone or in combination, the active matrix liquid crystal display device as claimed comprising, a color filter layer over the thin film transistor with a thickness determined to facilitate successful formation of a contact hole having a width of no more than 5 μm .

As to independent claims 6, 7, and 17, relevant prior art of record did not disclose, alone or in combination, the method of making an active matrix liquid crystal display device as claimed comprising the steps of forming a color filter layer over the thin film transistor with a thickness determined to facilitate successful formation of a contact hole having a width of no more than 5 μm and forming a contact hole having a width of no more than 5 μm in said color filter layer at said thickness.

The closest combination is Zhong et al (Zhong) USPAT 5,994,721 in view of Ohta et al (Ohta) USPAT 6,208,399 B1.

Zhong discloses (entire patent, especially Figures 6(a)-6(c) and 11) an active matrix liquid crystal display device (col. 8, line 22 through col. 11, line 28), comprising: a first substrate, 19, and a second substrate, 51, at least one of said first substrate and said second substrate being transparent; a plurality of scanning lines, 7, formed on said first substrate; a plurality of signal lines, 5, formed on said first substrate crossing said

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scanning lines in a matrix manner a plurality of thin film transistors, each said thin film transistor respectively formed at an intersection of said scanning lines and said signal lines, each said thin film transistor comprising: a gate electrode, 17, formed on said first substrate; a gate insulation layer, 21, formed on said gate electrode; a semiconductor layer, 23, formed on said gate insulation layer; a drain electrode, 29, formed on a first portion of said semiconductor layer and a first portion of said gate insulation layer; and a source electrode, 31, formed on a second portion of said semiconductor layer and a second portion of said gate insulation layer; at least one color filter, 101, formed on said first substrate; a plurality of pixel electrodes, 3, each respectively connected to one of said thin film transistors through a contact hole, 35, and each respectively formed on one of said at least one color filter; a counter electrode, 49, formed on said second substrate; and a liquid crystal layer, 45, between said first substrate and said second substrate, said liquid crystal layer being driven by electric fields between said pixel electrodes and said counter electrode to thereby make a display, wherein said color filter is formed directly on said first substrate (per Figure 6(c)) in substantially all of a light transmission region within a pixel area surrounded by said scanning lines and said signal lines, providing an efficient high aperture display [Abstract, Applicant's a thickness of said color film forming said color filter being a preselected first thickness that provides a sufficient chromaticity for said color filter; please note that the display of Zhong has a preselected first thickness that does provide the color display of Zhong with efficient high aperture display performance, per Zhong], and said color film comprises a stack of layers [stacked on top of transistor layers] that reduces a thickness

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of material of said color filter near said contact hole such that said second thickness is processed successfully to form a functional contact hole [Applicant's thickness chosen to permit a photo-crosslinkage to occur in an entire thickness of said second thickness of said color filter material during an exposure processing of said contact hole] (per Figure 6(c)).

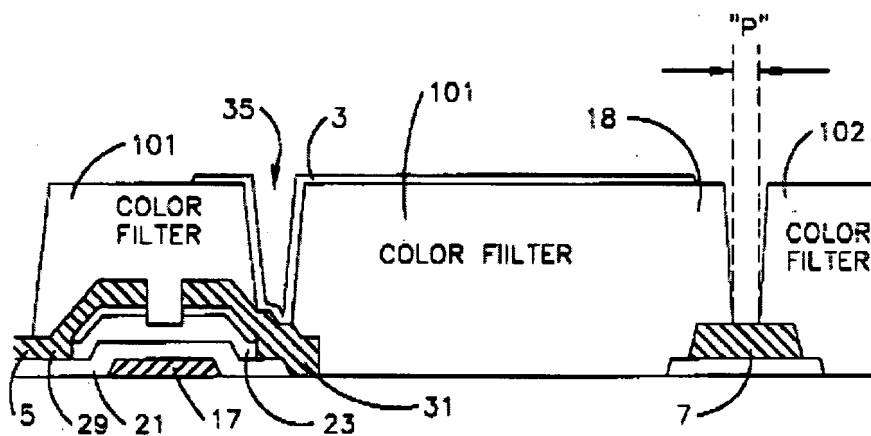
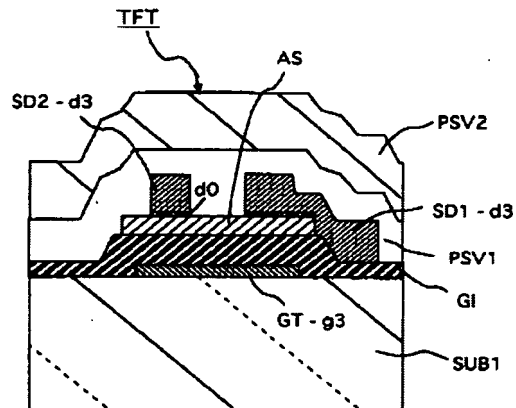


FIG. 6(c)

Ohta teaches the use of a passivation film exclusively over and in direct physical contact with the TFT portions to protect a back channel portion of the TFT and thereby stabilize a threshold voltage, V_{th} (col. 8, lines 34-67) without warping of the substrate caused by the stress of said passivation layer. Please note that modification of the device of Zhong with the passivation film of Ohta would result in said passivation film and said color film form a stack of layers that reduces a thickness of material of said color filter near said contact hole such that a portion of said passivation film remains in place adjacent to said contact hole.

FIG. 3



However, no prior art was found, with proper motivation to combine, to teach the claimed width dimension of said contact hole is no more than approximately 5 μm .

Shimada et al (Shimada) UAPAT 6,147,722 teaches contact holes in the range of 3.5 to 6 μm for use in small display panels for cameras and projectors [col. 18, lines 55-65], but they use a design wherein the contact hole does not penetrate the color filter [key aspect of the present invention]. Shimada is not considered usable as prior art due to a lack of teaching a 5 μm contact hole through a color filter.

Dependent claims are allowable due to their dependence on allowed claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L. Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Timothy L Rude
Examiner
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tlr


ANDREW SCHECHTER
PRIMARY EXAMINER